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AMENDMENTS TO THE CLAIMS

Please amend claims 1-2, 5-13, 17 and 20-28, and cancel claims 4 and 19.

1. (currently amended)   In an electronic device, a method for controlling disposition of a candidate object in an object-oriented environment, said method comprising:

determining a first value indicative of a number of references to said candidate object that are not references from other objects in the object-oriented environment;

determining a second value indicative of a number of references to said candidate object from other objects in the object-oriented environment;

determining a third value indicative of a number of cyclic paths including said candidate object;

controlling disposition of said candidate object on the basis of said first value, said second value and said third value;

wherein a cyclic path is a strongly connected component such that no node within the strongly connected component has an external reference and no node within the strongly connected component is connected, either directly or indirectly, to an object having an external reference.

2. (currently amended)   The method of claim 1, wherein determining ~~a~~ said first value comprises reading an external-reference count.

3. (original)   The method of claim 1, wherein controlling disposition of said candidate object on the basis of said first value comprises:

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determining, on the basis of said first value, whether there exists at least one reference to said candidate object that is not from another object in the object-oriented environment; and

marking said candidate object for preservation if there exists at least one reference to said candidate object that is not from another object in the object-oriented environment.

4. (canceled)

5. (currently amended)   The method of claim ~~4~~ 1, wherein determining ~~a~~ said second value comprises reading an internal-reference count.

6. (currently amended)   The method of claim ~~4~~ 1, wherein determining ~~a~~ said third value comprises:

identifying a referred object that lies on a path containing a reference originating at said candidate object;

determining a fourth value indicative of a number of references to said referred object that originate at other objects in the object-oriented environment, said fourth value being associated with said referred object; and

determining a fifth value indicative of the number of cyclic paths to said candidate object that pass through said referred object, said fifth value being associated with said referred object.

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7. (currently amended)   The method of claim 6, wherein determining ~a~ said third value further comprises:

    initializing a sixth value associated with said referred object, said sixth being indicative of a number of cyclic paths known to include said candidate object and said referred object; and

    adjusting said sixth value if said referred object has a reference directly to said candidate object.

8. (currently amended)   The method of claim 7, wherein determining ~a~ said third value further comprises:

    identifying a referring object having a reference to said referred object; and

    detecting a defined relationship between said fifth value and said sixth value associated with said referred object,

    adjusting a seventh value associated with said referring object in response to detection of said defined relationship, said seventh value being indicative of a number of known cyclic paths that include said candidate object and said referring object.

9. (currently amended)   The method of claim 8, wherein detecting ~a~ said defined relationship between said fifth value and said sixth value comprises determining that said fifth value and said sixth value are equal to each other.

10. (currently amended)   The method of claim 8, wherein adjusting ~a~ said seventh value comprises adjusting said seventh value by an amount corresponding to said sixth value.

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11. (currently amended)   The method of claim ~~4~~ 1, wherein controlling disposition of said candidate object on the basis of said second value and said third value comprises:

> determining if said candidate object is externally unreachable or externally reachable;

> designating said candidate object for destruction if said candidate object is externally unreachable; and

> designating said candidate object for preservation if said candidate object is externally reachable.

12. (currently amended)   The method of claim ~~4~~ 1, wherein:

> determining ~~a~~ said third value comprises:

> classifying a path to said candidate object as originating at an external reference or not originating at an external reference; and

> controlling disposition of said candidate object comprises designating said candidate object for destruction if no path to said candidate object originates at an external reference.

13. (currently amended)   The method of claim 12, wherein classifying ~~a~~ said path comprises:

> for each object on said path, determining if said object has an external reference; and

classifying said path on the basis of whether at least one object on said path has a reference selected from the group consisting of an external reference and an internal reference from an object not reachable from said candidate object.

14. (original) The method of claim 1, wherein controlling disposition of said candidate object on the basis of said first value comprises:

determining whether said candidate object is referenced from outside of a tree; and

marking said candidate object for preservation if there exists a reference to said candidate object from a tree.

15. (previously presented)   In an electronic device, a method for automatic control of disposition of a candidate object in an object-oriented programming environment, said method comprising:

detecting deletion of a reference to a candidate object;

determining a number of cyclic paths that include said candidate object in the object-oriented programming environment;

determining a number of internal references to said candidate object, wherein internal references are references from other objects in the object-oriented programming environment;

controlling disposition of said candidate object on the basis of a defined relationship between said number of internal references and said number of cyclic paths;

wherein a cyclic path is a strongly connected component such that no node within the strongly connected component has an external reference and no node

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within the strongly connected component is connected, either directly or indirectly, to an object having an external reference.

16. (previously presented)   A computer-readable medium having encoded thereon software for causing a computer to control disposition of a candidate object in an object-oriented environment, said software comprising instructions for causing a computer to:

determine a first value indicative of a number of references to said candidate object that are not references from other objects in the object-oriented environment;

determine a second value indicative of a number of references to said candidate object from other objects in the object-oriented environment;

determine a third value indicative of a number of cyclic paths including said candidate object;

control disposition of said candidate object on the basis of said first value, said second value and said third value;

wherein a cyclic path is a strongly connected component such that no node within the strongly connected component has an external reference and no node within the strongly connected component is connected, either directly or indirectly, to an object having an external reference.

17. (currently amended)   The computer-readable medium of claim 16, wherein said instructions for:

determining ~~a~~ said first value comprise instructions for causing said computer to read an external-reference count.

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18. (original)   The computer-readable medium of claim 16, wherein said instructions for controlling disposition of said candidate object on the basis of said first value comprise instructions for causing a computer to:

determine, on the basis of said first value, whether there exists at least one reference to said candidate object that is not from another object in the object-oriented environment; and

mark said candidate object for preservation if there exists at least one reference to said candidate object that is not from another object in the object-oriented environment.

19. (canceled)

20. (currently amended)   The computer-readable medium of claim 19 16, wherein said instructions for causing said computer to determine a said second value comprise instructions for causing said computer to read an internal-reference count.

21. (currently amended)   The computer-readable medium of claim 19 16, wherein said instructions for causing said computer to determine a said third value comprise instructions for causing said computer to:

identify a referred object that lies on a path containing a reference originating at said candidate object;

determine a fourth value indicative of a number of references to said referred object that originate at other objects in the object-oriented environment, said fourth value being associated with said referred object; and

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determine a fifth value indicative of the number of cyclic paths to said candidate object that pass through said referred object, said fifth value being associated with said referred object.

22. (currently amended)   The computer-readable medium of claim 21, wherein said instructions for causing said computer to determine-a said third value further comprise instructions for causing said computer to:

initialize a sixth value associated with said referred object, said sixth value being indicative of a number of cyclic paths known to include said candidate object and said referred object; and

adjust said sixth value if said referred object has a reference directly to said candidate object.

23. (currently amended)   The computer-readable medium of claim 22, wherein said instructions for causing said computer to determine-a said third value further comprise instructions for causing said computer to:

identify a referring object having a reference to said referred object; and

detect a defined relationship between said fifth value and said sixth value associated with said referred object,

adjust a seventh value associated with said referring object in response to detection of said defined relationship, said seventh value being indicative of a number of known cyclic paths that include said candidate object and said referring object.

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24. (currently amended)   The computer-readable medium of claim 23, wherein said instructions for causing said computer to detect a said defined relationship between said fifth value and said sixth value comprise instructions for causing said computer to determine that said fifth value and said sixth value are equal to each other.

25. (currently amended)   The computer-readable medium of claim 23, wherein said instructions for causing said computer to adjust a said seventh value comprise instructions for causing said computer to adjust said seventh value by an amount corresponding to said sixth value.

26. (currently amended)   The computer-readable medium of claim 19 16, wherein said instructions for causing computer to control disposition of said candidate object on the basis of said second value and said third value comprise instructions for causing said computer to:

determine if said candidate object is externally unreachable or externally reachable;

designate said candidate object for destruction if said candidate object is externally unreachable; and to

designate said candidate object for preservation if said candidate object is externally reachable.

27. (currently amended)   The computer-readable medium of claim 19 16, wherein:

said instructions for causing said computer to determine a said third value comprise instructions for causing said computer to:

classify a path to said candidate object as originating at an external reference or not originating at an external reference; and

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said instructions for causing said computer to control disposition of said candidate object comprise instructions for causing said computer to designate said candidate object for destruction if no path to said candidate object originates at an external reference.

28. (currently amended)   The computer-readable medium of claim 27, wherein said instructions for causing said computer to classify ~~a~~ said path comprise instructions for causing said computer to:

for each object on said path, determine if said object has an external reference; and

classify said path on the basis of whether at least one object on said path has reference selected from the group consisting of an external reference and an internal reference not reachable from said candidate object.

29. (original)   The computer-readable medium of claim 16, wherein said instructions for causing said computer to control disposition of said candidate object on the basis of said first value comprise instructions for causing said computer to:

determine whether said candidate object is referenced from outside of a tree; and

mark said candidate object for preservation of there exists a reference to said candidate object from a tree.

30. (previously presented)   A computer-readable medium having encoded thereon software for causing a computer to automatically control disposition of a candidate object in an object-oriented programming environment, said software comprising instructions for causing said computer to:

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detect deletion of a reference to a candidate object;

determine a number of cyclic paths that include said candidate object;

determine a number of internal references to said candidate object, wherein internal references originate from other objects in the object-oriented programming environment;

control disposition of said candidate object on the basis of a defined relationship between said number of internal references and said number of cyclic paths;

wherein a cyclic path is a strongly connected component such that no node within the strongly connected component has an external reference and no node within the strongly connected component is connected, either directly or indirectly, to an object having an external reference.

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CONCLUSION

Please charge any shortage or credit any overpayment of fees to our Deposit Account No. 12-0080, under Order No. MWS-083. In the event that a petition for an extension of time is required to be submitted herewith, and the requisite petition does not accompany this response, the undersigned hereby petitions under 37 C.F.R. §1.136(a) for an extension of time for as many months as are required to render this submission timely. Any fee due is authorized to be charged to the aforementioned Deposit Account.

In view of the above amendments, Applicant believes that the pending application is in condition for allowance and urges the Examiner to pass the claims to allowance. Should the Examiner feel that a teleconference would expedite the prosecution of this application, the Examiner is urged to contact the Applicant's attorney at (617) 227-7400.

Dated: February 1, 2007   Respectfully submitted,

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